STANDARDS AND CALIBRATION LABORATORY

CALIBRATION PROCESS MANUAL

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INTRODUCTION

This manual describes the administrative requirements for the calibration process. It is designed to be used both for initial training of individuals involved in performing calibrations and as a reference for more experienced individuals.

While the manual addresses most of the issues directly related to calibrating an item, it is only a part of the Standards and Calibration Laboratory quality program. The program in its entirety is described in SCL-PD-0001, "Quality Assurance Program Plan," and the other planning documents referred to in that Plan.

Whenever possible, the requirements outlined in this manual should be adhered to. Cases may arise, however, where specific exceptions to these requirements are necessary.

If it is necessary to deviate from manual requirements, document the nature of the exception and the reason for it on laboratory stationary, sign it, and obtain the approval signature of the group leader. Include the documentation in the report package.

1. RECEIPT AND INPROCESSING

Processing

Customer brings equipment for calibration

Administrative Assistant
- Sign on to the system and log in the file number.
- Verify file number and item information.
- Verify contact information, record delivery information: area, building, and room.
- Print scheduling tag (Exhibit 1.1).
- Give receipt to customer.
- Separate scheduling card from instrument tag and attach both to instrument.
- Place instrument on the Equipment to be Processed shelf.

Technician
- Inprocess, calibrate, and outprocess item.

Customer requests pickup service

Customer phones in request for instrument to be picked up for calibration.

Administrative Assistant
- Takes message and leaves message for the Materials Handler.

Emergency service

Customer requires emergency service.

Customer
- Complete X-Priority Request form (Exhibit 1.2).
- Have form signed by division leader.
- Bring form and instrument to the SCL group office.

Administrative Assistant
- Give form and instrument to appropriate technician (or group leader).

Technician
- Inprocess, calibrate, and outprocess item immediately.
- Complete bottom half of form and file in binder labeled X-Priority Requests for Calibration in group office.

INCOMING EQUIPMENT TAGS

White carbon instrument tag

Use the white, carbon instrument tag (Exhibit 1.3) only when the database system is not available. The customer must provide the following information:

Contact: The name of the person to whom the report and recall notices should be sent.

Phone: The contact's phone number.

MS: The contact's mail stop.

Comments: Any special instructions that may apply.

File No: Should be left blank for new items; complete if old recall item and file number is shown on item.

Item Name: A brief description of the item.

Group: The contact's group.

Date: The date the item is submitted for calibration.

Delivery: Area, building, room number.

Give the customer the pink copy as a receipt. Attach the white and buff copies to the item. Place the item on the Equipment to be Processed shelf in the equipment room.

Scheduling Tag

Print a Scheduling Tag (Exhibit 1.1) off the database system for all items that are received. The tag has three blocks: Instrument Tag, Scheduling Card, and Customer Receipt.

Give the customer the Customer Receipt and attach the Instrument Tag and Scheduling Card to the item.

Place the item on the Equipment to be Processed shelf in the equipment room.

TRANSFER OF EQUIPMENT

The technicians are responsible for checking the Equipment to be Processed holding area at frequent intervals and inprocessing any items that are in their assigned areas.

Recall and New items

- Remove the Scheduling Card from the instrument and place it at the bottom of your scheduling board, leave the Instrument Tag on the instrument.

- Transfer the tagged instrument to the Incoming Equipment shelf.

DISTRIBUTION OF RECALL NOTICES

Purpose

Recall notices are generated monthly on Los Alamos Letterhead (Exhibit 1.4) and distributed to customers to let them know their items are due for recalibration.

Responsibility

Database Manager
- Print monthly recall notices.
- Print query of all recalibrations due within the given month.
- Print query of balance calibrations.
- Print effort report for Bechtel.

Administrative Assistant
- Send recall notices to customers,
- Receive recall items for all Standards and Calibration Laboratory items.
- Distribute ESH-9 tags to appropriate technician.
- Photocopy and distribute list of all recalibrations for the given month to technicians to estimate potential workload.
- Mail Bechtel effort report to Bechtel contact.

2. THE CALIBRATION PROCESS

DETERMINING CALIBRATION METHOD

The technician performing the calibration is responsible for determining an appropriate calibration method and carrying it out correctly. The calibration method must be chosen from the following sources, in order of preference.

- The SCL has developed a number of approved calibration procedures that describe the accepted method for performing a calibration. When available for the item under test, the approved procedure must be used and must be followed exactly unless, in the opinion of the technician performing the calibration, adherence to the procedure would result in incorrect results. In this case, the technician should note any deviations from the procedure in the report package documentation, and should initiate a revision to the procedure at the earliest possible date thereafter.

- In many cases where procedures have not been developed, approved dataforms may be available. Because these dataforms specify the types of data to be measured, they serve to improve the uniformity of calibrations performed by the SCL. When available for the item under test, an approved dataform must be used and must be followed exactly unless, in the opinion of the technician performing the calibration, adherence to the dataform would result in an incorrect or incomplete test. In that case, the technician should alter the dataform as necessary and complete the calibration. The reason for the alteration should be noted in the report package documentation, and the technician should initiate a revision to the dataform as soon as possible thereafter.

- When no approved calibration procedure or dataform is available, the technician must determine a suitable calibration method based upon their knowledge and experience. The following sources, which are maintained by the SCL, may be consulted for guidance. Because they have not been approved by the SCL, these sources serve only as guidance and need not be consulted or followed exactly.

    - Approved procedures and dataforms for items similar to the item under test.
    - Microfilmed producers from the DOD Government-industry Data Exchange Program (GIDEP).
    - Air Force calibration procedures.
    - Manufacturer's literature.
    - Federal specifications.

CALIBRATION PROCESS

The calibration process consists of those actions that take place from the time an item is removed from the equipment room and transported to the laboratory to the time it is returned to the equipment room. The results of the calibration process are a completed report package and calibration label, as described in the following sections. Further description of the calibration process itself is addressed in the documents referred to above and beyond the scope of this manual.

MINIMUM ACCURACY RATIO

Accuracy ratio is defined as the tolerance of the item being calibrated (e.g., 4%) divided by the tolerance assigned to the standard used to make the measurement (e.g., 1%). The accuracy ratio in this example is 4:1.

An accuracy ratio of 4:1 is the minimum allowed without compensating for the uncertainty of the standards used in the process. When the accuracy ratio is equal to or greater than 4:1, the tolerance of the item being calibrated may be reported as the uncertainty of the test. When the accuracy ratio is less than 4:1, the uncertainty to be assigned to the item under test must be calculated. Refer to the section of this manual titled "Uncertainty Calculations" for more information about calculating uncertainty.

CONDITION GRADES

The condition of the item is summarized by assigning a letter grade to it's "as-received" and "after-adjustment status. In cases where no adjustments are made, the two conditions will be identical. The letter grades to be used for both the "as-received" and "after-adjustment" conditions are:

As-Received Evaluation		As-Returned Evaluation	
A	**This item was found to have no out of tolerance conditions upon receipt.**	**A**	**This item was found to have no out of tolerance conditions.**
B	**This item was received with a limitation due to a previous limited calibration, this is a calibration where only a part of the full calibration was accomplished due to request or capability, and no out of tolerance conditions were found upon receipt.**	**B**	**This item was returned with the previous limitations as received or limitation was placed upon the item due to request or capability.**
C	**This item was received with an out of tolerance condition.**	**C**	**This item was returned with the previous limitations as received or a limitation was placed upon the item du to request or capability.**
F	**This item was received in a condition where the item was inoperable.**	**F**	**This item was rejected due to the conditions that require repair, obsolescence or the cost of bringing item into compliance with tolerances required to operate usefully.**

3. RECORDING THE CALIBRATION

REPORT PACKAGE REQUIREMENTS

Calibration, Special Test, and Rejection Reports

Report packages for Calibration Certificates, Special Tests, and Rejection Reports performed by the SCL, must, as a minimum, include each of the following:

- One signed, SCL report for each person specified on the report's distribution, plus one to be retained in the SCL files.

- A completed history sheet, including calibrated equipment used.

- Raw data or a completed data form.

  If the data was collected automatically and analyzed automatically under computer control, the printed output of the computer program will be considered raw data.

  If the item is rejected because it is non-functional, no raw data is required.

  Raw data from "Calibrate Before Use" items used to perform the calibration should be included in the report package for the item under test.

- The calculations, if any, that were required to obtain the reported results from the raw data.

  If the calculations were performed by a computer data reduction program, only the output from the program need be included.

  If the calculations were simple operations performed on an electronic calculator, they need not be documented.

- Any calculations used to arrive at the uncertainty or tolerance limits stated in the report.

  If the tolerance stated in the report comes from published specifications such as those issued by the instrument manufacturer, the Air Force, GIDEP, or the federal government, no uncertainty calculation need be included. However, the source of the specifications must be stated on the report, history sheet, or data form.

  In the case of Rejection Reports for rejected items, these calculations are not required.

No Calibration Required

Report packages for No Calibration Required reports must, as a minimum, include each of the following:

- One signed, SCL report for each person specified on the report's distribution, plus one to be retained in the SCL files.

- A completed history sheet (in this case, no calibrated equipment will be specified).

NIST Report packages for calibrations performed by NIST (which does not assign certification uncertainties and expiration criteria) must, as a minimum, include each of the following:

- The report issued by NIST.
- One signed SCL report for each person specified on the report's distribution, plus one to be retained in the SCL files. The purpose of this report is to document the certification uncertainty and expiration date for the calibration.
- A completed history sheet.
- Any calculations used to arrive at the uncertainty or tolerance limits stated in the report.

  If the tolerance stated in the report comes from published specifications such as those issued by the instrument manufacturer, the Air Force, GIDEP, or the federal government, no uncertainty calculation need be included. However, the source of the specifications must be stated on the report, history sheet, or data form.

PSL Report packages for calibrations performed by PSL or a standards laboratory approved by PSL for calibration of final acceptance equipment must, as a minimum, include each of the following:

- The report issued by the calibration source.
- A completed history sheet.

REPORT CONTENT

Requirements for the Calibration Certificate, Special Test Report, Rejection Report, and No Calibration Required are described in the following section.

Calibration Certificate The results of every calibration will be documented on a Calibration Certificate (Exhibit 3.1). A Calibration Certificate will also be issued for all calibrations performed by NIST (Exhibit 3.2). The certificate should be formatted similar to Exhibit 3.1 or 3.2, and must include, as a minimum, each of the following:

- The file number, name, manufacturer, and serial number of the item being calibrated. If the item has no serial number, its property number or other unique identification (if any) should be used instead.
- The date the item was calibrated and the date the calibration expires.

- A statement guaranteeing the traceability link to national standards.

- A Calibration Information checklist that specifies whether the item was received in tolerance or out of tolerance and whether it was returned in tolerance or limited. (The definition of a limited certification can be found in the section titled Calibration Labels.) The checklist may also specify additional information if desired. (Omit for NIST report.)

- When the Calibration Information checklist indicates that an item has been received in an out-of-tolerance condition, the report must describe the condition in enough detail that the customer can determine whether it would affect the validity of his/her prior measurement results.

  In addition, an Out-of-Tolerance Notification Form (Exhibit 3.3) must be stapled to the calibration report by the originating technician.

- The results of the calibration (or, in the case of a NIST calibration, a reference to an attached report).

- If the calibration was performed with the instrument under computer control, include a statement that this was the case (because instruments sometimes have different specifications when operated automatically).

- The tolerance limits or specifications for the calibration. (If the calibration was performed with the instrument under computer control, use the specifications that apply to this case). In cases where the tolerance limits or specifications are very lengthy (mostly electrical items), the first page of the dataform may be formatted as a Specification Sheet (Exhibit 3.4) suitable for inclusion in the Calibration Certificate. In this case, the Calibration Certificate should refer to these specifications and the Specification Sheet should be attached.

- A statement to the effect that the reported results are expected to remain within the stated tolerance limits for the duration of the calibration interval. The following forms of this statement are recommended:

  Under normal operating conditions, this item is expected to remain within the specified tolerance limits (or stated uncertainty/accuracy) for the duration of the calibration interval.

  This item (or item name) is expected to remain within the specified tolerance limits (or stated accuracy/uncertainty), provided it is used in accordance with the manufacturer's operating conditions and not subjected to any physical damage.

  Additional pages must include the file number, page number, and expiration date.

Special Test Report

In cases where a measurement is made of an item that is neither a standard nor measuring equipment, and for which the customer desires no recall, a Special Test Report (Exhibit 3.5) will be issued instead of a Calibration Certificate. Special Test Reports should be formatted similar to Exhibit 3.5 and must include, as a minimum, each of the following:

- The file number, name, manufacturer, and serial number of the item being measured. If the item has no serial number, its property number or other unique identification should be used instead.
- The date the test was performed.
- A statement guaranteeing the traceability link to national standards.
- The results of the measurement.
- The uncertainty of the reported results.

Rejection Report

When an item submitted for calibration is found to be inoperative or outside usable tolerance limits, it should be rejected. The rejection will be documented by issuing a Rejection Report similar to that shown in Exhibit 3.6. The report must include, as a minimum, each of the following:

- The file number, name, manufacturer, and serial number of the item being measured. If the item has no serial number, its property number or other unique identification should be used instead.
- The date the test was performed.
- The reason for the rejection.

No Calibration Required

When a customer asks the SCL to certify that an item is of a type not normally calibrated (for example, a power supply), a No Calibration Required report documenting this determination may be issued. This report should be similar to Exhibit 3.7 and must include, as a minimum, each of the following:

- The file number, name, manufacturer, and serial number of the item. If the item has no serial number, its property number or other unique identification should be used instead.
- The date the determination was made.
- The reason or basis for the determination.

Distribution

The intended distribution of each report must be included at the bottom of the report. A signed, original of the report must be made for each point of distribution.

The Metro Database Contact Table should be considered the official source of name and mailstop information. For contacts who are not in the database or contacts who indicate a change in mailstop on the scheduling card, use the information on the scheduling card. If that is not available, use the phone book.

If you know a contact has changed their mailstop (or any other information), you should notify the database manager immediately so the correction can be entered into the database.

Reports for customers external to the SCL must be distributed to the contact and one copy kept for the SCL files.

Reports for the SCL equipment must be distributed to the SCL files. If desired, additional copies may be specified for the person performing the calibration or the metrologist in charge of the area.

REPORT FORMAT

Process Calibration Certificates, Special Test Reports, Rejection Reports, No Calibration Required Reports, and Specifications must be produced using a standard letterhead.

Preprinted Paper Preprinted paper with the appropriate letterhead is maintained by the SCL and may be used if the technician chooses to print only the report body.

Computer-Generated Letterhead If desired, the letterhead may be included in the same computer file as the body of the report and printed out on a blank piece of paper along with the rest of the report. If this method is used, the headings must be produced using the Arial and Times Romans fonts in WordPerfect 6.0 or higher, or their equivalents (Swiss, Geneva, and Reporter are equivalent to Arial, and Tiempo and Roman are equivalent to Times Roman). An explanation of fonts, point sizes, and samples of headings are shown in Exhibit 3.8.

White, cotton-fiber paper (textured, watermarked) must be used for printing Calibration Certificates, Rejection, Special Test, and No Calibration Required reports. Regular bond paper may be used for Specification Sheets.

HISTORY SHEET CONTENT

The history sheet (Exhibit 3.9) records information about the item calibrated, its location, the equipment used to calibrate it, and other administrative information about the calibration. Every report package must include a hard copy of the history sheet.

Entering history sheet into database History sheet information should be entered directly into the administrative database by the technician performing the calibration. The database will produce a hard copy that is included in the report package. For more information regarding use of the administrative database, refer to the Metrology Database User's Manual (SCL-PD-0012).

Completing History Sheet

The calibration label and certain parts of the history sheet must be reviewed and initialed by another member of the SCL as indicated under "Sticker Review" on the history sheet. The purpose of this review is to minimize transcription errors on the calibration label. In the case of on-site calibrations where no member of the SCL is available to conduct a sticker review, "N/A" may be entered in this field.

Sign and date the history sheet in the blank marked "Signature."

RAW DATA AND DATA FORMS CONTENT

Raw data is the original numerical measurement data from a calibration. It may be recorded on a blank sheet of paper, or a data form may be used if one is available. Unless the item under test is non-functional, or a specific exception is made (see below), all calibrations must include raw data. The raw data must include the following:

- File number or other ID

- Calibration date

- "As-found" condition:
  a. Actual or input values used to determine "as-found" condition.*
  b. Measured values.
  c. Tolerance limits (if applicable).
  d. Identification of any measured values exceeding the tolerance limits.

- "After adjustment" Condition :
  a. Actual or input values.
  b. Measured values.
  c. Tolerance limits (if applicable).
  d. Identification of any measured values exceeding the tolerance limits.

*May be fewer values than used to determine condition after adjustment.

The following exception may be made to the requirements for raw data: If the time required to record numerical values in the "as-found" and "after-adjustment" conditions is unreasonable, or if numerical data would be meaningless due to the resolution of the instrument, an abbreviated format may be used in which a measured value that is within tolerance is denoted by a check mark, and only those measured values that are out of tolerance are actually recorded.

CALCULATIONS

Calculations may be required to transform the raw data into a form suitable for reporting to the customer. Unless specific exceptions are made (see below), all calculations must be included in the report package, either on a sheet of paper or on a data form. These may be the same papers on which the raw data is recorded.

The following exceptions may be made to the requirement for including calculations in the report package:

- If the calculations were performed by a computer data reduction program, only the output of the program need be included.

- If the calculations were simple operations performed on an electronic calculator, they need not be documented.

UNCERTAINTY CALCULATIONS

In cases where no published tolerance limits are available, or when the accuracy ratio is less than 4:1, it is necessary to calculate the uncertainty limits that will be reported to the customer. These calculations must be included in the report package in one of the following ways:

- The General Uncertainty Calculations worksheet (Exhibit 3.10) may be used. This worksheet is useful as a guide, but need not be rigorously adhered to. However, all judgements and calculations used to arrive at the reported uncertainty must be documented, and the Type II or III uncertainty must be used in the calibration report.

- The uncertainty calculation may be documented on a separate sheet of paper in any format desired. The reported uncertainty must, however, include an estimate of drift or wear over the calibration interval.

4. OUTPROCESSING INSTRUMENTS

RETURNING EQUIPMENT

After completing the calibration and preparing the report package, follow these steps for outprocessing equipment.

Report package
- Place the report package in a manila folder and write the file number and date calibrated on the tab.

Label review
- Select a calibration label according to the criteria in Section 5 , CALIBRATION LABELS and fill it out.
- Submit the label to any member of the group to assure that no transcription errors were made in filling it out. The criteria for this review are specified on the bottom of the history sheet.
- Have the reviewer co-sign the sticker and initial the history sheet in the report package. In the case of on-site calibrations and No Calibration Required reports, this review may be eliminated and "NA" entered on the history sheet.
- When the review is complete, attach the label to the instrument.

Pickup or delivery
- Phone the customer to inform them the calibration is complete. Ask whether they would prefer to pick up the item themselves at the SCL or have it delivered.
- If the customer wants to pick up the item, place the Scheduling Card on the Completed Equipment board under the appropriate section (electrical, physical, or dimensional).
- If the customer requests delivery, place the Scheduling Card on the Completed Equipment board under Equipment to be Delivered.

Equipment outgoing
- Place the instrument on the Completed Equipment-Outgoing shelf, making sure the Instrument Tag is attached.

SUBMITTING REPORT PACKAGE TO QA

Process

The completed report package consists of all items specified in Section 3, RECORDING THE CALIBRATION. The report package must be contained in a manila folder with the file number and date calibrated written on the tab and submitted to the quality assurance (QA) specialist for review.

All report packages must be entered into the Metro database, then placed in the Report Package “IN” Box found in the report processing area in the group office (Exhibit 4.1). This method is used to track the report during the QA review process.

QA Review Checklist

The QA Review Checklist (Exhibit 4.3) is used by QA when reviewing report packages completed by the technicians. The checklist identifies all requirements needed to complete a report package. If any discrepancies occur, the appropriate field(s) is checked and/or is stated on the checklist. The report package with discrepancies is then sent back to the technician for explanation of statement or correction.

Logging and tracking the report

Follow these steps for logging and tracking the report package.

The technician shall complete the following:

- File Number: enter calibration file number.
- Initial and Date: enter the date you submitted the report package for review and your initials.
- Place the report package in the Calibration Report file box.

The quality assurance review is conducted according to the criteria specified in SCL-PD-0013, "Quality Assurance Review". The remainder of the logbook page shall be completed by the quality assurance specialist as follows:

- Forward to QA for Review: initial and dates this space upon retrieving the report package from Calibration Report file box.
- QA Review: date this space upon completing the report package review.
- Forward to Technician for Correction: date this space if the report package has been returned to the originator for corrections.
- Report Filed: date this space when the report package is finally filed in the SCL file room.

5. CALIBRATION LABELS

LABELING EQUIPMENT

Process Calibration labels are used to indicate the calibration status of equipment. All customer equipment calibrated by the SCL and all measuring and test equipment owned by the SCL, including power supplies and other sources, must bear one of the following labels.

Customer equipment previously calibrated by the SCL or another source may bear an outdated label. If so, the old label should be removed or covered by a new label.

The labels are shown in Exhibit 5.1.

DESCRIPTION OF LABELS

Reference Standard (Gold Border, SCL internal use only): An item that establishes traceability for the SCL. Such items are calibrated by NIST, PSL, a standards laboratory approved by PSL for calibration of final acceptance equipment, or in themselves provide an accepted realization of a natural physical constant.

Note: To ensure uniform labeling within the SCL, items that are labeled by the calibrating agency must be given a duplicate Reference Standard label.

Certified (Blue Border): An item that has been calibrated against primary standards or other certified equipment, and was found to meet all applicable specifications after adjustments (if any).

Certification Limited (Red Border): An item for which calibration has been performed on a limited subset of normally available functions, ranges, or attributes; an item that does not meet all applicable specifications; or an item that must be matched with other calibrated equipment in order to achieve all of its functions, ranges or attributes.

Calibration Not Required (Black Border): An item that is not relied on for measurement data, as determined by the lead technician in the area where the item resides. When necessary, output parameters of these items will be monitored using calibrated equipment.

Rejected (Black on Red): Items that are found to be inoperative or outside usable tolerance limits.

Expired (Black on Red): An item whose calibration has exceeded its expiration date.

Calibration Void if Seal is Broken (Black on Silver): This label is applied to items that have externally accessible adjustments that would invalidate the calibration if disturbed. The label is attached in such a manner that an attempt to adjust the instrument will result in breaking the seal.

Calibrate Before Use (Orange Border): An instrument that will be calibrated before each use.

Item Inactive (Green Border): An item intended for measurement but which is not presently in use.

6. AMENDMENTS AND CORRECTIONS

AMENDED CALIBRATION REPORTS

Process If an error is found in a calibration report at any time after it has been issued, the report must be corrected. If possible, the correction should be made by the author of the original report or the successor. If the originator is not available, the correction will be made by an engineer or the group leader. Corrections can be made by one of two means:

Minor errors Minor errors such as misspellings that do not affect technical content may be corrected on the original report by crossing out the incorrect portion, writing in the corrected information, and signing and dating the correction. A copy of the corrected report need not be sent to the customer in this case.

Technical errors Errors that affect technical content should be corrected by issuing an amended report. The report will be identified by the words "Amended Report" centered at the top of the page (Exhibit 6.1). The distribution for the amended report should be the same as for the original report, with a copy included for the SCL files.

Any corrections made will be identified by an asterisk next to them. At the bottom of the report, a note identified by an asterisk will explain each amendment. After the author signs the amended report, the report package will be submitted to the quality assurance specialist for review as described in the following section "Quality Assurance Review of Amendments."

AMENDED HISTORY SHEETS

Process If errors are found on the history sheet after entry into the database, make the necessary changes in ink, and initial and date each change. Then take one of the following actions:

If report has not been reviewed If the report package has not yet gone through the review process, simply submit the package for review. The presence of changes will alert the quality assurance specialist to make a copy of the history sheet for the database manager, who will correct the database.

If report has been reviewed If the report package has gone through the review process and the report has been issued to the customer, submit the entire report package to the quality assurance specialist as described in the following section "Quality Assurance Review of Amendments."

AMENDED RAW DATA OR CALCULATIONS

Errors found in the raw data or calculations should be corrected by crossing out the incorrect portion, writing in the corrected information, initialing, and dating the correction. If the error requires a change in reported results, the report must be amended as described above.

AMENDED DATA FORMS AND SOFTWARE

Approved data forms and calibration software may not be amended. All corrections must be made through the normal revision process. (This restriction does not apply to the raw data recorded on a data form.)

AMENDED CALIBRATION INTERVALS

Process Calibration intervals may be amended after the original calibration report has been issued. If possible, the amendment should be made by the author of the original report or the successor. If the originator is not available, the amendment will be made by the supervisor, an engineer, or the group leader. Calibration intervals may be amended in the following two ways:

Shortened interval An interval may be shortened for any reason. To shorten an interval, the interval and expiration date on the original history sheet must be corrected by crossing out the original information, correcting it, signing and dating the correction, and noting the reason for the change in the "comments" section. An amended report and a new label with the amended expiration date must then be issued.

Lengthened interval An interval may be lengthened beyond its original expiration date only in unusual cases such as a test or experiment in progress that cannot be completed before the calibration expires. In such cases, the original contact, the supervisor, or the successor may request an amended interval by writing a memorandum to the SCL group leader stating the need for the amendment. The group leader will consult with the technician who originally performed the calibration to determine whether the request should be granted, and will file the memorandum in the report package along with an explanation of action taken .

Cross check If it is decided to lengthen the interval, a documented cross-check or comparison must b performed by the technician who performed the original calibration or the successor to verify that the item is still within its previously assigned tolerance limits. If it is not possible to perform a comparison, the justification for not performing it must be documented as described below. Based on these results, the interval may be lengthened, provided that the lengthened interval may not exceed the smaller of twice the original interval or five years.

To document the lengthened interval, a new report package must be initiated. The new report (a Calibration Certificate) must describe the cross-checks or comparisons that were made and the reasoning that justified assigning a lengthened interval (if it was not possible to make these checks, the reason must be described in the report). The report and history sheet will document the amount by which the interval and expiration date were extended, an the history sheet will document the calibrated equipment used to make the cross-checks.

Note: an amendment is not required when the interval assigned to a subdivision of instruments is permanently changed. The process for making permanent interval changes is described in SCL-PD-0010, "Calibration Intervals."

QUALITY ASSURANCE REVIEW OF AMENDMENTS

Any amendment to the report, raw data, calculations, history sheet, or any other aspect of the report package that is made after the package has been reviewed must be submitted for a review of the amendments.

To obtain this review, remove the entire package from the file storage area and submit it to the quality assurance specialist, along with the amendments and any explanation that may be required. If the package includes an amended report, the quality assurance specialist will distribute it and file one copy in the report package along with the original report.

The quality assurance specialist is also responsible for making sure that any changes that affect the database are transmitted to the database manager for correction.

7. ADDITIONAL TOPICS

ITEMS CALIBRATED INCORRECTLY

Process In some cases, it is discovered that the calibration of an item was not performed correctly. For example, a standard used in a calibration may be found out-of-tolerance upon recalibration, casting doubt on the calibration results; or an error may be found in the software used to collect data for a calibration. If an incorrect calibration is discovered, take one of the following actions:

Expired item If the error occurred in a calibration that has already expired, no action is necessary.

Active item, error can be calculated If the error occurred in a calibration that is currently active and the effect of the error can be calculated, determine whether the error is large enough to place the reported results place the reported results outside the reported uncertainty limits.

If so, either amend the calculations and report as described above, and send the customer an amended report, or immediately recall the instrument for recalibration.

If not, amend the history sheet as described above, by making notation in the “comments" section describing the error and its consequences. The customer need not be notified in this case.

Active item, error can't be calculated If the error occurred in a calibration that is currently active and the effect of the error cannot be calculated, the instrument must be immediately recalled for recalibration. The history sheet for the erroneous calibration must be amended as described above by making a notation in the "comments" section describing the error and the decision to recalibrate. The calibration to correct the error is then treated as an ordinary recalibration.

ITEMS RENUMBERED ACCIDENTALLY

Process Items that have been previously calibrated are sometimes received with the label missing and therefore appear to be new items. If a new number is assigned to such an item and it is later discovered that the item had been previously calibrated, one of the following actions must be taken:

If report has not been issued If the report has not yet been issued, correct the error by changing the number on the report and database record back to the previously assigned number. Delete the entry in the file number assignment book that corresponds to the new (incorrect) file number; this number may not be assigned to another item.

If report has been issued If the report has been issued, the newly-assigned number should not be changed. The following actions must be taken:

The history sheet from the latest calibration must be amended as described above by making a notation in the "comments" section explaining the error in assignment and cross-referencing the old and new file numbers. The history sheet from the previous calibration (which used the old file number) must also be amended by making a similar notation in the "comments" section.

CHANGES IN RECALL STATUS OF ITEMS

Process A customer may request that items assigned to them be removed from the active recall system (for example, when an item is destroyed or excessed). They may also request that items previously made inactive be reinstated as actively recalled items.

Reclassify item A Reclassify Item form (Exhibit 7.1) must be filled out to make the old file number inactive or active. On this form, use the item's old file number and check the line to change from a current recall status of A (active) to a status of I (inactive), or from status of I (inactive) to a status of A (active).

The completed Reclassify Item form is then included in the report package for the latest calibration. As described above under "Quality Assurance Review of Amendments," both report packages are then given to the quality assurance specialist for review.

8. CONTROLLED STORAGE ITEMS

ITEMS OWNED BY OTHER ORGANIZATIONS

Process

Certain Laboratory organizations store items calibrated by the SCL under controlled conditions, then place them in service at a later date. These organizations have approval from DOE to begin the calibration interval at the date of issue rather than the date of calibration, so long as the date of issue does not exceed the expiration date originally assigned by the SCL (in this case, the maximum expiration date is one interval beyond the original expiration date, with the provision that in no case will the total span from original calibration to final expiration exceed five years).

Items to be placed in controlled storage are not identified prior to calibration. They are treated the same as any other calibration, and the SCL's records (history sheet, calibration report, and database entry) will reflect an expiration date calculated from the calibration date and the usual calibration interval. However, in order to make sure the files at the SCL agree with those of the owning organization, the following procedures apply. The administrative assistant is responsible for filing the documents specified below.

Item placed in controlled storage

Upon receipt of a Controlled Storage Data Form, HS-QA-DF-3, from the owning organization with the top portion completed, the item will be designated as being in controlled storage (Exhibit 8.1). The administrative assistant will file the form in the report package.

Item issued from controlled storage

Upon receipt of a Controlled Storage Data Form with both the top and "In Service Data" portions completed, the item will be designated as having been issued from controlled storage. The administrative assistant will file the form with the report package. The expiration date on the history sheet, calibration report, and database record will not be changed. Instead, the new expiration date will be indicated by the "Date Recalibration Due" on the Controlled Storage Data Form.

Recall notices for controlled items

Recall notices for controlled storage items will be issued following the usual the SCL procedures. They will specify the originally-assigned expiration date of the item. This will serve as a reminder to the owning group that the item, if it is still in controlled storage, should be recalibrated.

9. ITEMS CALIBRATED AT SANDIA LABS

DISTRIBUTION OF RECALL NOTICES

Process Recall notices are received monthly from the Primary and Secondary Standards Lab at Sandia National Laboratory in Albuquerque and are distributed to customers and SCL technicians to let them know their items are due for recalibration.

Responsibility Administrative Assistant
- Review recall card for correctness.
- If SCL file number does not appear as "Property No," ask database manager to retrieve file number, contact, group, and mail stop from database.
- Write in SCL file number in "Property No." space.
- Write in users name, group, mail stop, and phone.
- Distribute recall cards.

TRANSPORTING ITEMS FOR CALIBRATION

Process The SCL periodically arranges for a material handler to hand-carry equipment to and from the Primary and Secondary Standards Laboratories at Sandia in Albuquerque for calibration. These items may be standards belonging to the SCL or customer equipment that the SCL does not have the capability to calibrate.

All items going to and from Sandia for calibration must be processed through the group office administrative assistant according to the following procedures.

Items going The material handler or administrative assistant will:

- Assign the instrument a file number (if it does not already have one).

- Print an instrument tag for each item.

  Use the Sandia Recall card and the printed scheduling form.

- In all cases, make sure the File Number also appears as the Property Number (this is the only way we can get Sandia to use our file number as a reference). Modify tag as shown in the examples (Exhibit 9.1).

- Attach all parts of the tag to the item and place item on the Sandia Outgoing shelf in the equipment room.

- On the day the items go to Sandia, check the tags for completeness and log items in the Sandia Equipment Log Book (Exhibit 9.2).

- Separate the tag for each item. Place the scheduling card in the Sandia rack (behind equipment room door) and leave the instrument tag attached to the item.

- Take items to Sandia PSL.

TRANSPORTING ITEMS FOR CALIBRATION - continued

Items returning The material handler or administrative assistant will

- Log the item's date returned in the Sandia Equipment Log book (Exhibit 9.3).
- Remove the scheduling card from the Sandia rack and place it with the instrument and Sandia report on the Equipment to be Processed shelf .
- File the Sandia shipper receipt (if one comes with the returning equipment) in the group office.

The technician will:

- Make the history sheet and sticker and proceed with the usual calibration reports.
- Arrange for return of the instrument to the customer and place it on the Completed Equipment/Outgoing shelf.
- Sign the scheduling card/receipt to indicate work complete and item returned to customer. File in Equipment Completed/Picked Up box in group office.

10. PICKUP AND DELIVERY OF EQUIPMENT

CUSTOMER SERVICE

Process The SCL provides pickup and delivery of customer's equipment for calibration. A material handler, acquired through Contract Services, currently performs this duty on a part-time basis. In accordance with the SCHEDULING AND RECEIVING EQUIPMENT policies outlined in Section 1, the following procedures shall be followed for pickup and delivery.

PROCEDURES FOR PICKUP

Telephone requests Customer phones in request for instrument to be picked up for calibration.

Administrative Assistant

- Notify Material Handler by giving him the pick up messages.

Material Handler

- Check clipboard for any pickups.
- List pickups on the Pickup/Delivery Route sheet (Exhibit 10.1) to track customer items, locations, and number of pieces for more efficient pickup.
- Pick up customer equipment.

Administrative Assistant

- Log in equipment.
- Attach Scheduling Card and Instrument Tag to instrument.
- Mail customers their receipts.
- Return tagged equipment to Equipment to be Processed shelf.

PROCEDURES FOR DELIVERY

Technician

Technicians are responsible for placing calibrated equipment on the completed Equipment shelves in the equipment room and putting Scheduling Cards on the Equipment Completed scheduling boards.

Material handler

- Remove all Scheduling Cards from delivery section of Equipment Completed Customer Delivery Shelf.
- Match cards with corresponding instruments on Completed Equipment Customer delivery Shelf.
- List deliveries on the Pickup/Delivery Route Sheet (Exhibit 10.1) to track customer items, location, and number of pieces for more efficient delivery.
- Load equipment in truck and deliver to customer.
- Upon delivery of item to customer, have customer sign and date Scheduling Card in space for "item picked up by."
- Return signed Scheduling Cards to file box marked Equipment Completed and Returned in equipment room. (Signed cards will be kept for one year.)

VISITORS

Visitors are allowed in the laboratory areas only upon invitation of a member of the standards and calibration lab, because their presence may affect the technicians ability to successfully complete calibrations. Any invitation may be canceled by the group leader if he believes it would be detrimental to the operation of the group. Visitors must be escorted at all times or given a safety briefing by the hosting group member and sign the log book.

APPENDIX A

Distribution List:

Baca, Leo
Blossom, Carolyn
Brophy, Jamie
Casados, Benino
Chandler, James
Clifford, Harry
Conley, Bob
DesGeorges, Louise
Gauler, Allen
Gurule, Elmer
Hammon, George
Martinez, Chris
Moxley, Thomas
Pelchat, Chris
Perrault, George
Portmann, Pierre
Salazar, Bernadette
Salazar, Michael
Sanchez, Antoinette
Serrano, Ramon
Van Aken, Jerry